# CSc 3320: Systems Programming

Spring 2021

Homework

# 1: Total points 100

Submission instructions:

1. Create a Google doc for each homework assignment submission.
2. Start your responses from page 2 of the document and copy these instructions on page 1.
3. Fill in your name, campus ID and panther # in the fields provided. If this information is missing in your document TWO POINTS WILL BE DEDUCTED per submission.
4. Keep this page 1 intact on all your submissions. If this *submissions instructions* page is missing in your submission TWO POINTS WILL BE DEDUCTED per submission.
5. Each homework will typically have 2-3 PARTS, where each PART focuses on specific topic(s).
6. Start your responses to each PART on a new page.
7. If you are being asked to write code copy the code into a separate txt file and submit that as well.
8. If you are being asked to test code or run specific commands or scripts, provide the evidence of your outputs through a screenshot and copy the same into the document.
9. Upon completion, download a .PDF version of the document and submit the same.

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**PART 1**

**Answer the following questions briefly. Provide clear and succinct reasoning.**

**Points per question = 5**

1. Tell the differences between Unix and Linux. Then please list some operating systems (at least three) which belong to Unix but not Linux.

**Unix is a proper operating system but Linux is built upon Unix. Linux is open-source but Unix is not. Other OS include; Solaris, Apple OS, BSD**

2. What is the pipe mechanism in UNIX? And show one command using pipe and explain how the pipe works in it?

**Output of one process can be used as input of the other process.**

**$who|sort: This code is an example where *who* shows logged users and *sort* sorts them A to Z (unless specified) and then outputs the result.**

3. In a Linux system, you can issue the command **ls /** to check the sub directories under root. Please describe the meanings of directory /bin, /dev, /boot, /usr, /etc, /mnt, /sbin, /var separately. For example, you can say that /bin contains binary executable files.

**/bin contains binary executable files**

**/dev device**

4. What is the meaning of Multitask and Multi-user in a Unix system?

**Multiple programs can run at the same time is called multitask. Multiuser allows multiple users to work at the same time and sharing**

**the resources of that computer.**

5. What does -rwxr-xr-x mean in terms of permissions for a file? What is the exact unix command (with the octal representation) for changing the permissions to this setting?

**Owner has read, write, and execute permissions for file. The group has read and execute permissions and public also has read and execute permissions. To change the permission using command, type**

**chmod 755**

6. In class, you have learned the meaning of read, write and execute permission for regular files. However, these permissions are also applied to directories. So please describe the meaning of read, write, and execute permission for directory.

**The read permission allows to see the list of files in that directory (Depends on the user permissions).**

**The write permission allows to make changes, including creating new files or deleting files in that directory (Depends on the user permissions).**

**The execute permission allows to enter and access any files in that directory**

## Part II-a

**Regular Expression**
**Find outcomes for each given basic/extended regular expression (maybe multiple correct answers)**

**Points per question: 2.5**

*Example:*
*'ab+a'（extended regex）*

***Answer**: aba , abba ; Pattern : The matched string should begin and end with 'a' and 'b' occurs at least once between leading and ending 'a')*

Note: 7) to 10) are basic regexes; Note: 11) to 18) are extended regexes.

7) 'a[ab]*a'

*aa, aaa, aba, aaba*

8) 'a(bc)?'

*a, abc*

9) '.[ind]*'

*mi, t, tn, td, ti, miidn*

10) '[a-z]+[a-z]'

*adbc, ptc, on*

11) '[a-z] (\+[a-z])+'

*s+t, a+x+e*

12) 'a.[bc]+'

*abb, abbc, aocb*

13) 'a.[0-9]'

*ax8,  ay0*

14) ‘[a-z]+[\.\?!]’

*z.,  fb?,  axes!*

15) ‘[a-z]+[\.\?!]\s*[A-Z]’

*M,  xyz!Z,  ijklm?b*

16) ‘(very )+(cool )?(good|bad) weather’

*very good weather*, *very cool good weather, very bad weather,*

*very cool bad weather*

17) ‘-?[0-9]+’
*4,  -53,  -46654,  1023*

18) ‘-?[0-9]*\.?[0-9]*’

*-7.6,  2.9,  -9.*

## Part II-b

**Regular Expression**
**Write down the extended regular expression for following questions.**
**E.g. Social security number in the format of 999-99-9999. Answer: [0-9]{3}-[0-9]{2}-[0-9]{4}**

**Points per question: 5**

19) Valid URL beginning with "http://" and ending with ".edu" (e.g. http://cs.gsu.edu, http://gsu.edu)

*/^(http):\/\/[\w\-_]+(\.[\w\-_]+)+([\w\-\.]*)*

20) Non-negative integers. (e.g. 0, +1, 3320)

*(([1-9][0-9])* | 0)?*

21) A valid absolute pathname in Unix (e.g. /home/ylong4, /test/try.c)

*([.\/]+[a-z]*)**

22) Identifiers which can be between 1 and 10 characters long, must start with a letter or an underscore. The following characters can be letters or underscores or digits. (e.g. number, _name1, isOK).

*[_a-Z]{10}*

23) Phone number in any of the following format: 9999999999,999-999-9999, (999)-999-9999. (Note: all of these formats should be matched by a single regular expression)

*([0-9]{3})-[0-9]{2}-[0-9]{4}*

## Part III

**Programming**

**Points per question: 15**

24. Create a file named homework_instructions.txt using VI editor and type in it all the submission instructions from page1 of this document. Save the file in a directory named *homeworks* that you would have created. Set the permissions for this file such that only you can edit the file while anybody can only read. Find and list (on the command prompt) all the statements that contain the word POINTS. Submit your answer as a description of what you did in a sequential manner (e.g. Step1 … Step 2… and so on..). Add a screenshot to your answer as a proof of evidence.